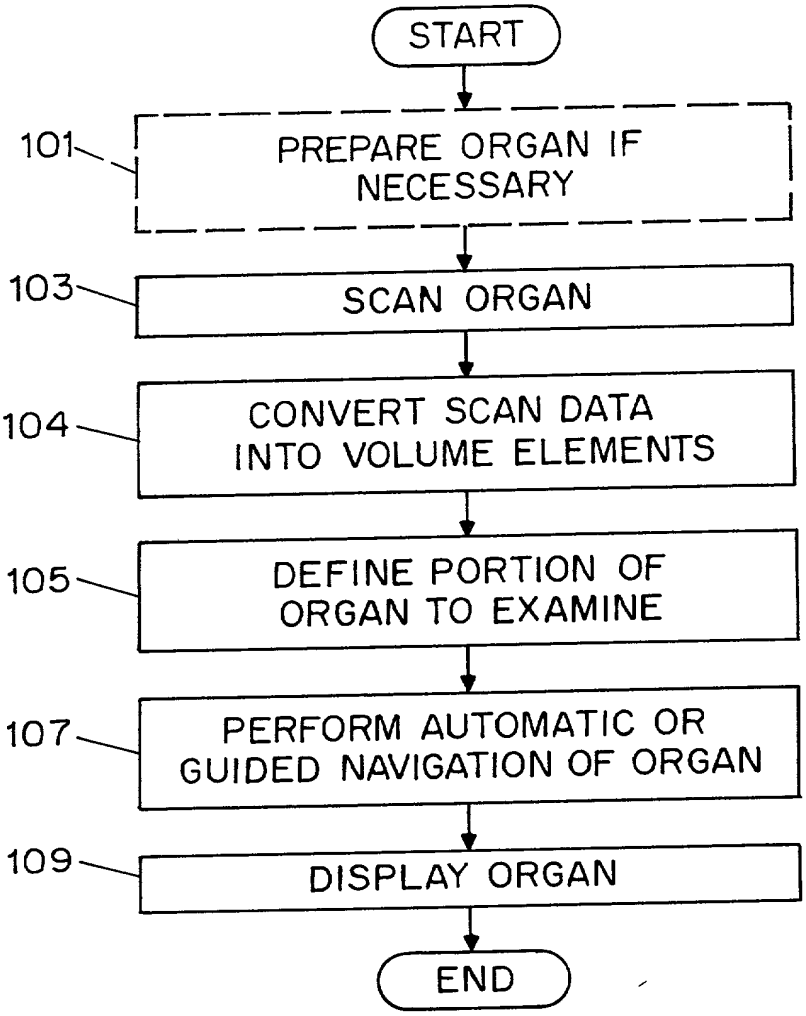

START
101
PREPARE ORGAN IF NECESSARY
103
SCAN ORGAN
104
CONVERT SCAN DATA INTO VOLUME ELEMENTS
105
DEFINE PORTION OF ORGAN TO EXAMINE
107
PERFORM AUTOMATIC OR GUIDED NAVIGATION OF ORGAN
109
DISPLAY ORGAN
END

FIG. 1

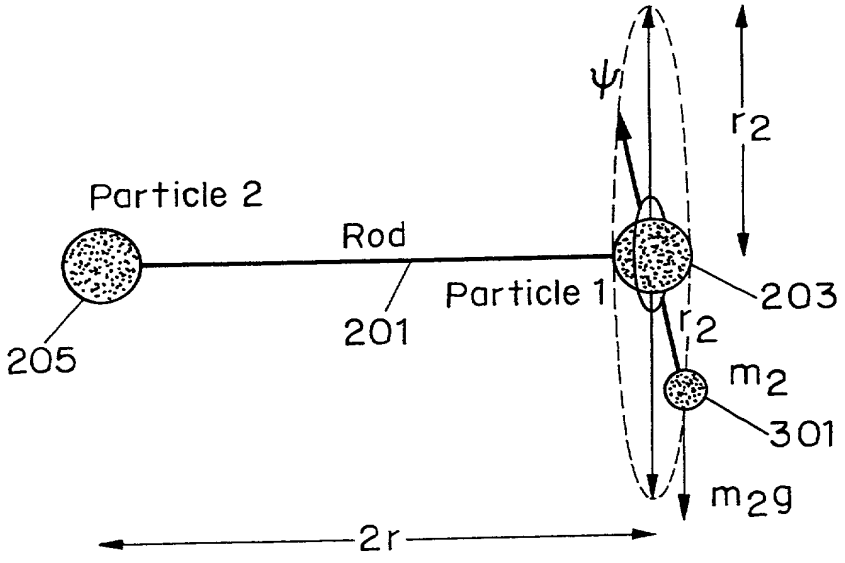

ψ
r2
Particle 2
Rod
Particle 1
203
205
201
r2
m2
301
m2g
2r

FIG. 3

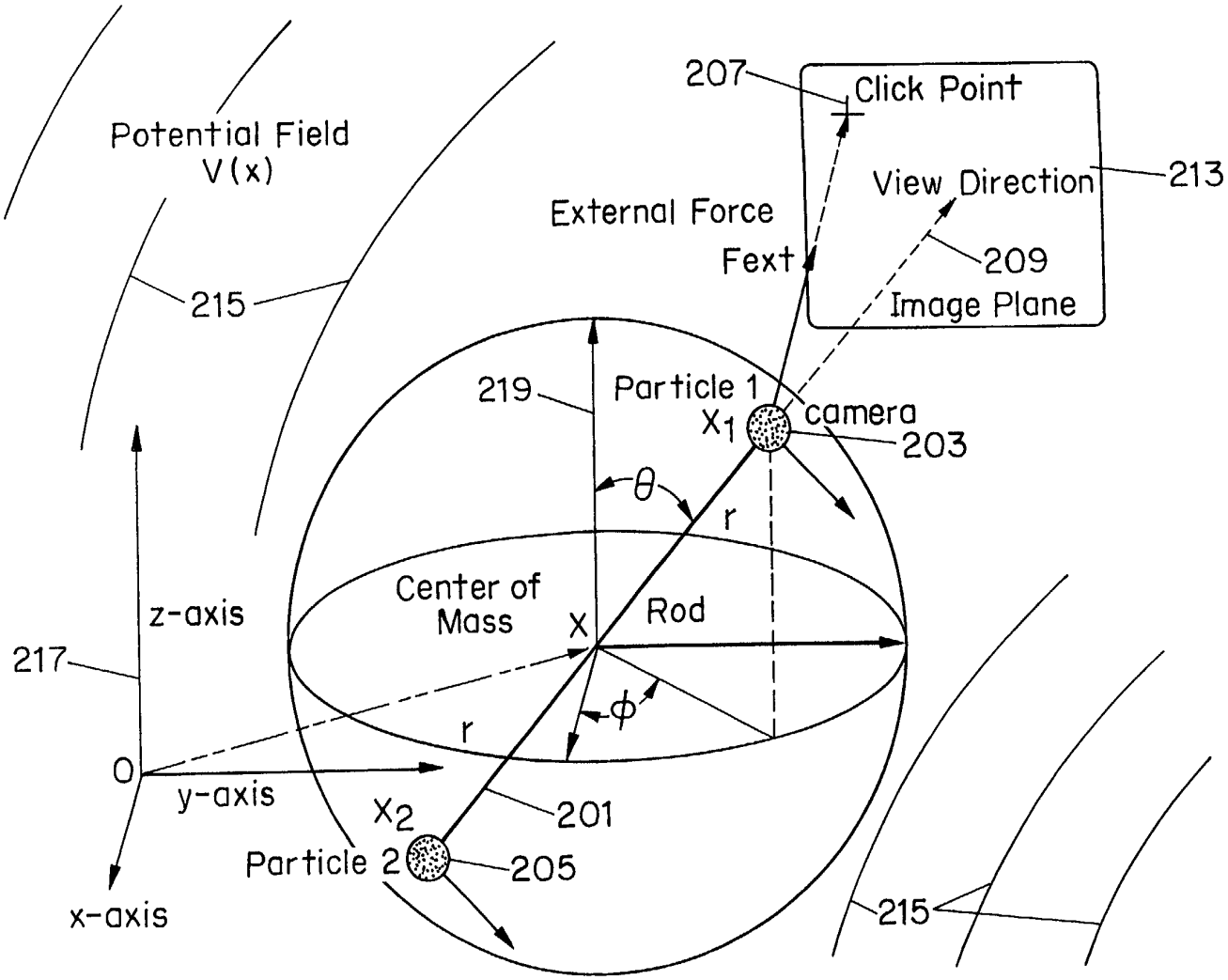

Potential Field
V(x)
215
207
Click Point
View Direction
213
External Force
Fext
209
Image Plane
219
Particle 1
X_1
camera
203
θ
r
Center of
Mass
X
Rod
z-axis
217
ϕ
r
0
y-axis
X_2
201
Particle 2
205
x-axis
215

FIG. 2

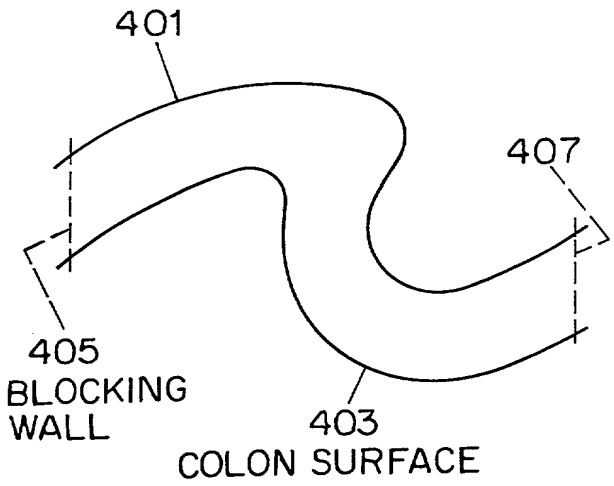


FIG. 4

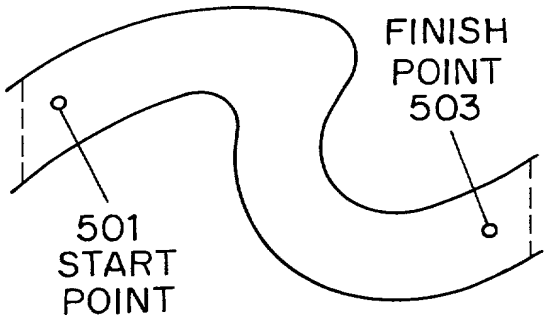


FIG. 5

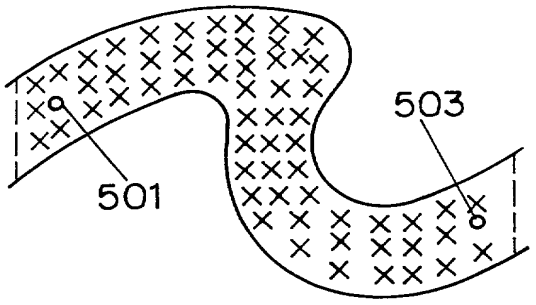


FIG. 6

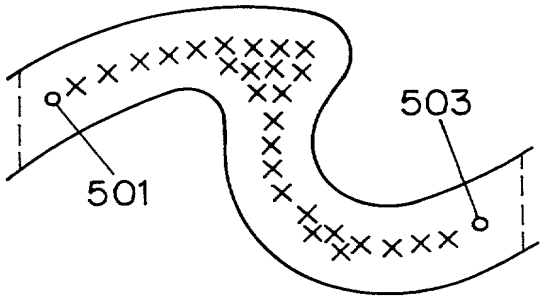


FIG. 7

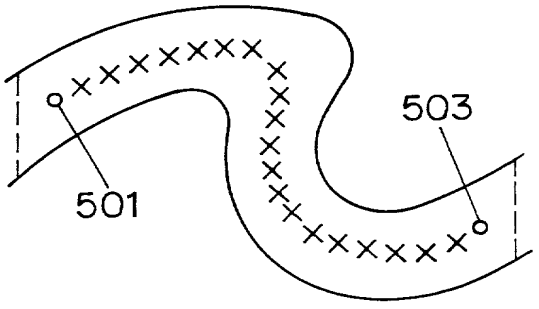


FIG. 8

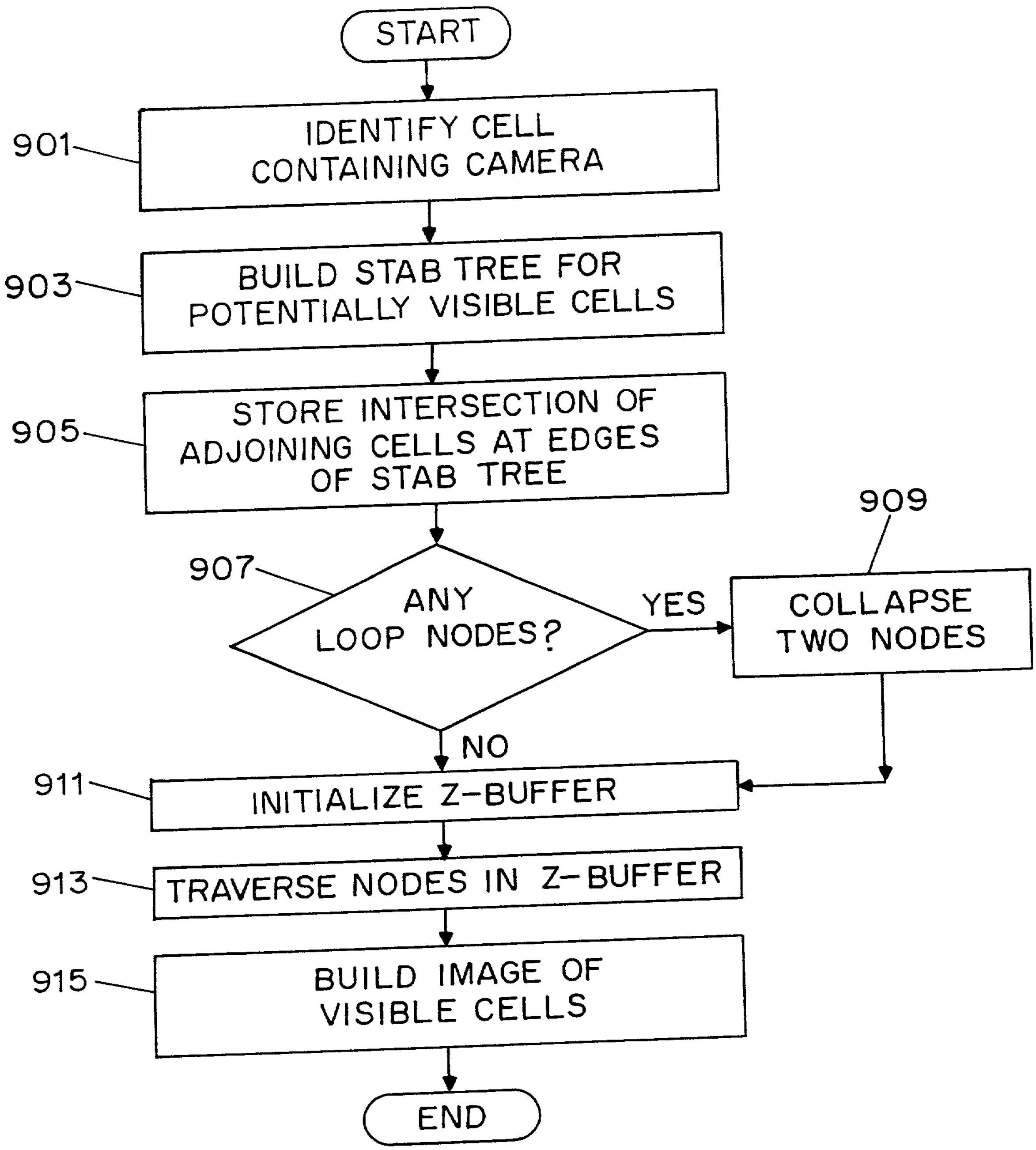


FIG. 9

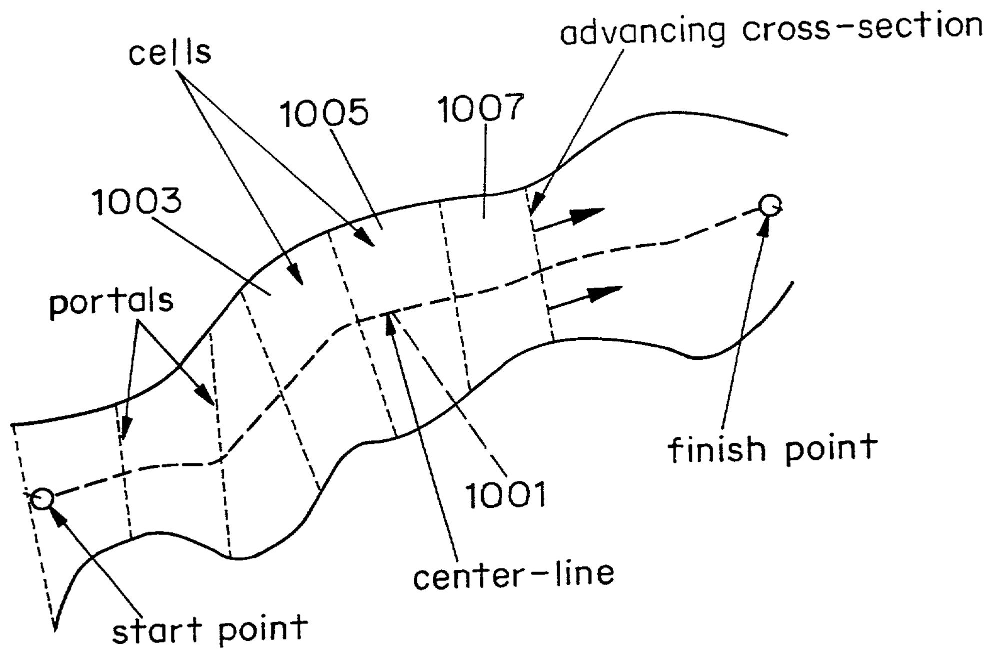


FIG. 10

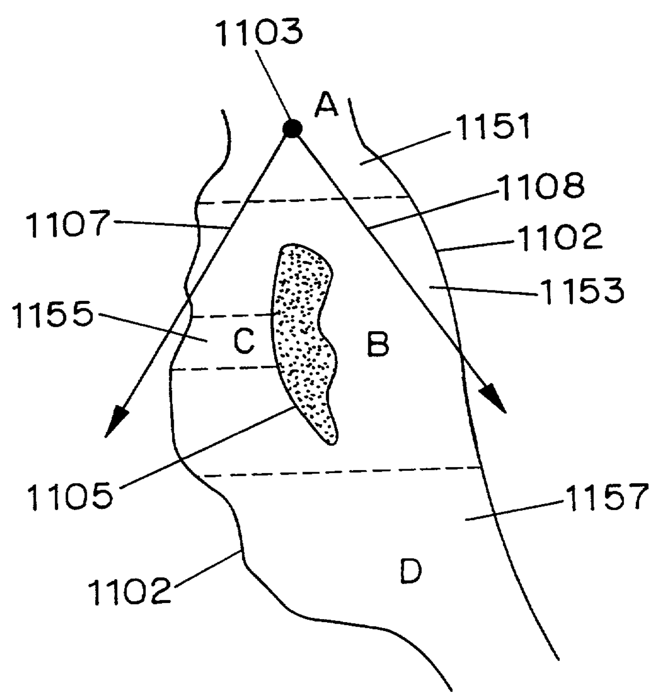


FIG. 11(a)

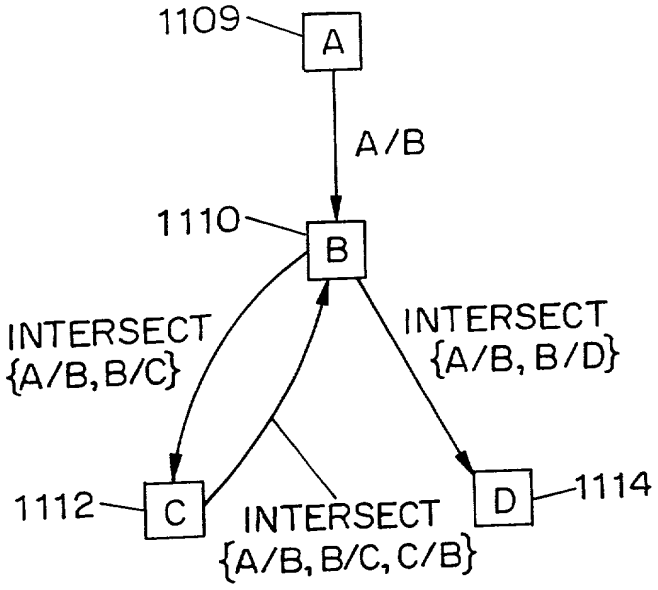


FIG. 11(b)

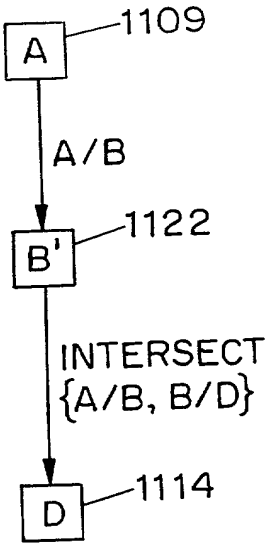


FIG. 11(c)

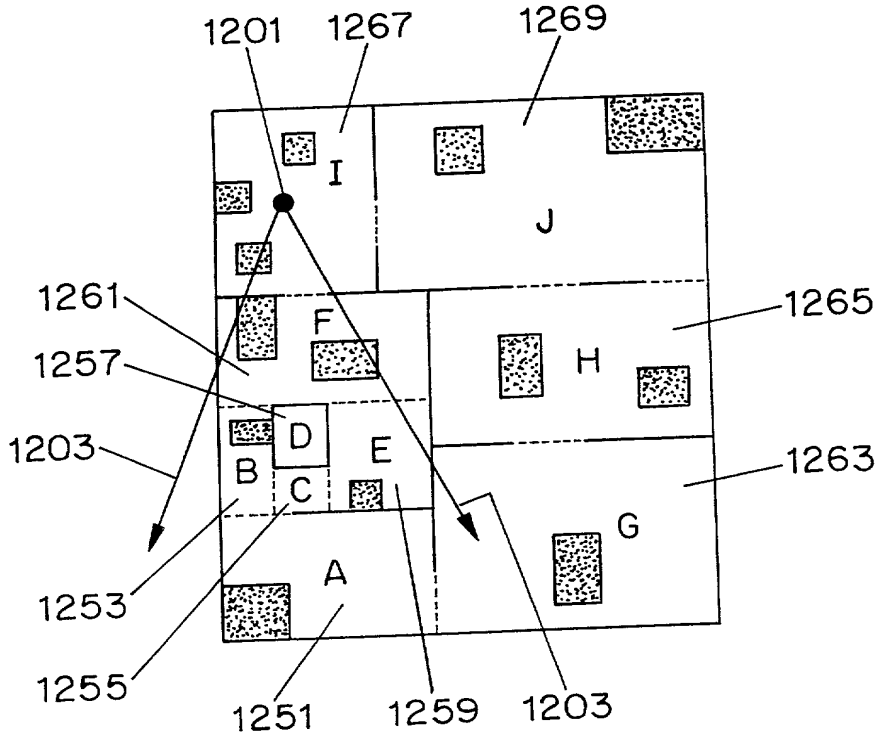


FIG. 12(a)

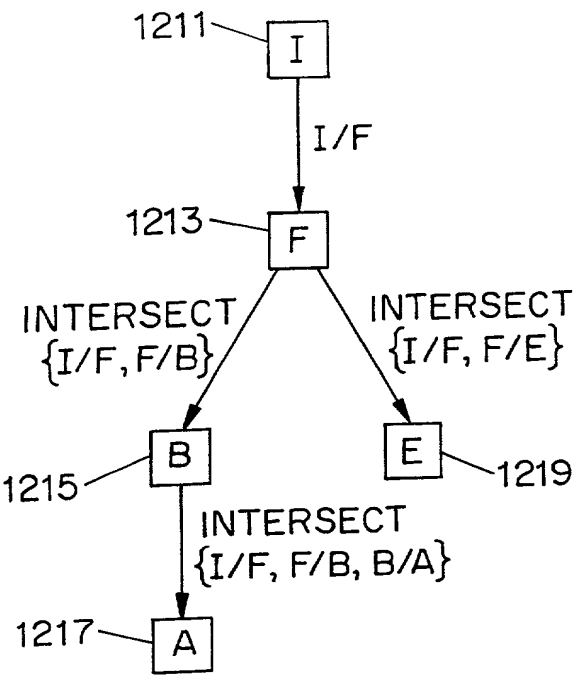


FIG. 12(b)

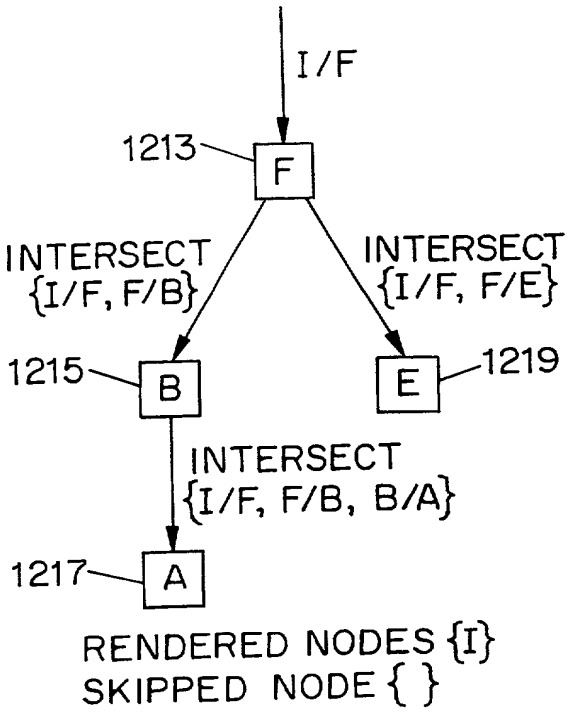


FIG. 12(c)

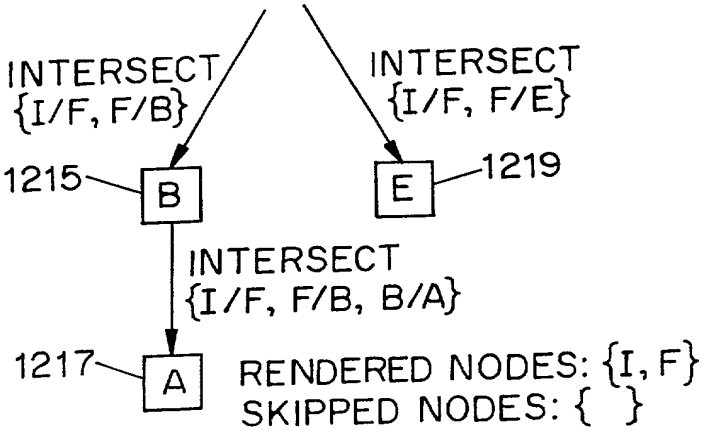


FIG. 12(d)

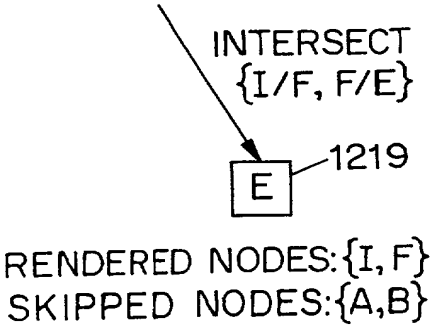


FIG. 12(e)

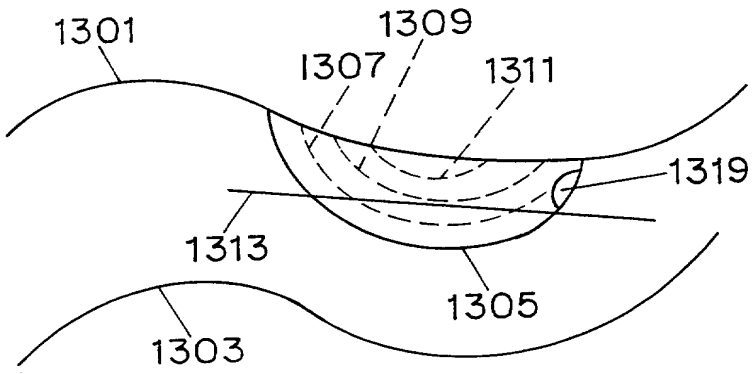


FIG. 13

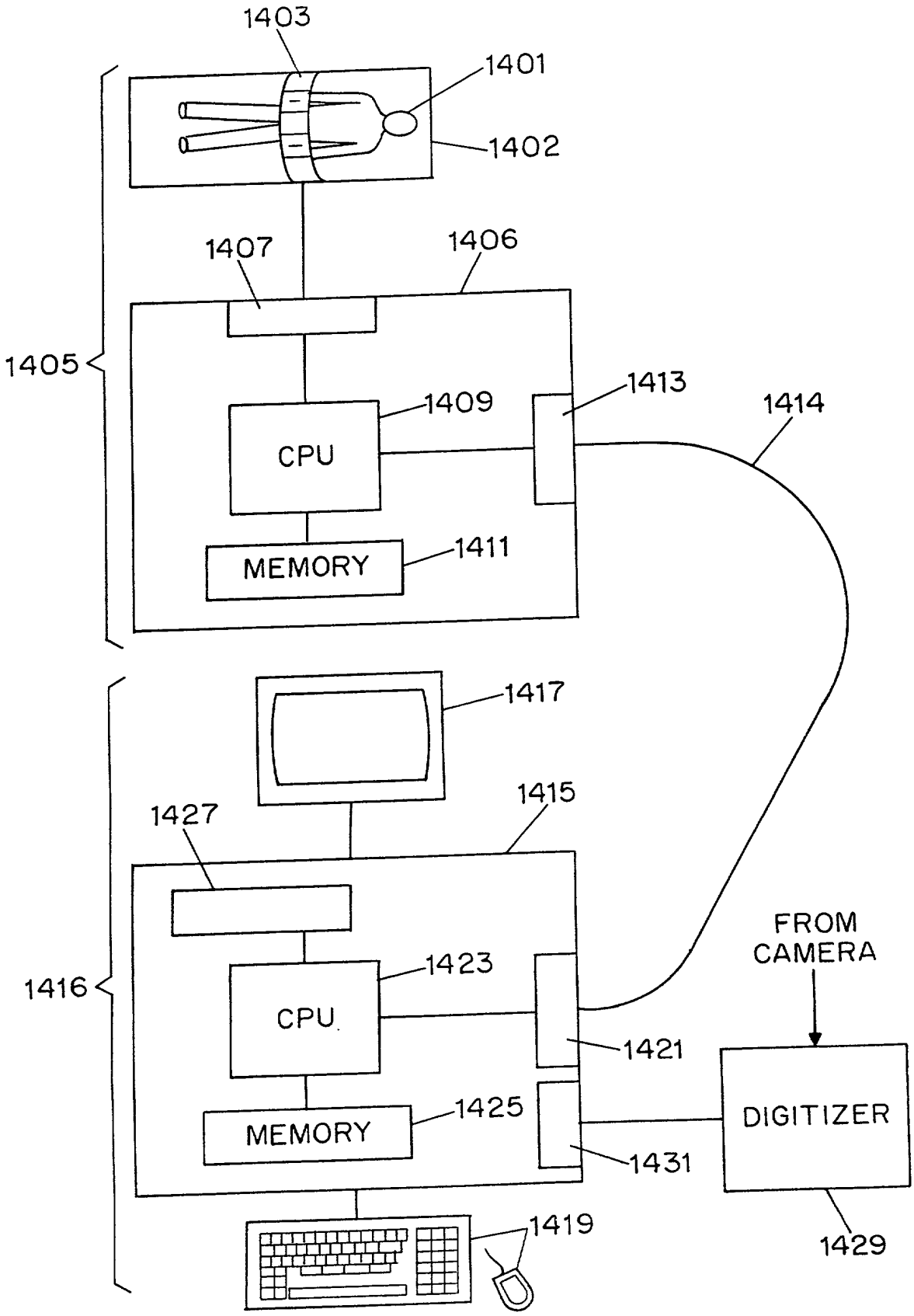

1403
1401
1402
1407
1406
1405
1409
1413
1414
CPU
MEMORY
1411
1417
1415
1427
1416
1423
CPU
FROM
CAMERA
1421
1425
MEMORY
DIGITIZER
1431
1419
1429

FIG. 14

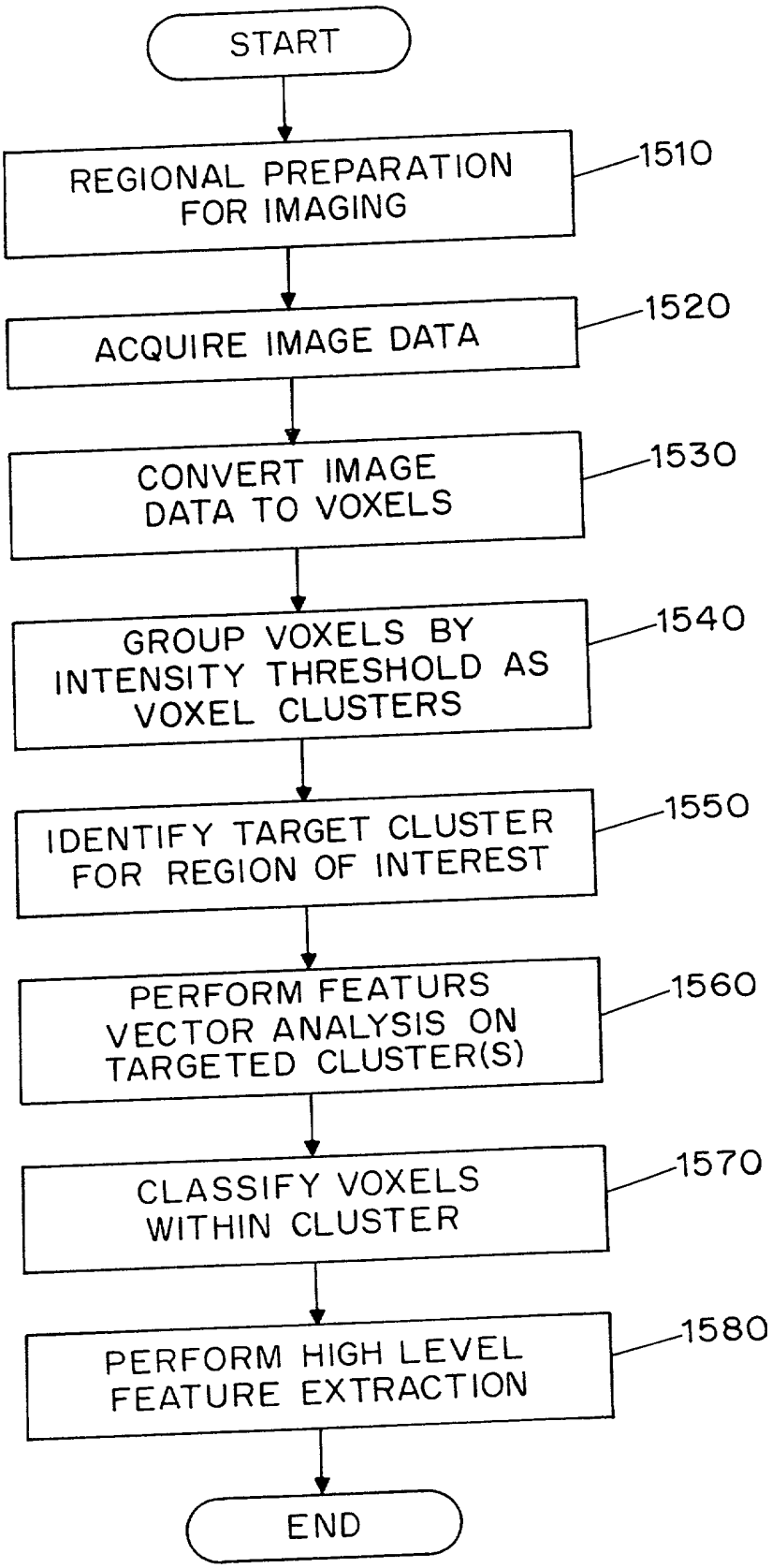

START
REGIONAL PREPARATION FOR IMAGING
1510
ACQUIRE IMAGE DATA
1520
CONVERT IMAGE DATA TO VOXELS
1530
GROUP VOXELS BY INTENSITY THRESHOLD AS VOXEL CLUSTERS
1540
IDENTIFY TARGET CLUSTER FOR REGION OF INTEREST
1550
PERFORM FEATURS VECTOR ANALYSIS ON TARGETED CLUSTER(S)
1560
CLASSIFY VOXELS WITHIN CLUSTER
1570
PERFORM HIGH LEVEL FEATURE EXTRACTION
1580
END

FIG. 15

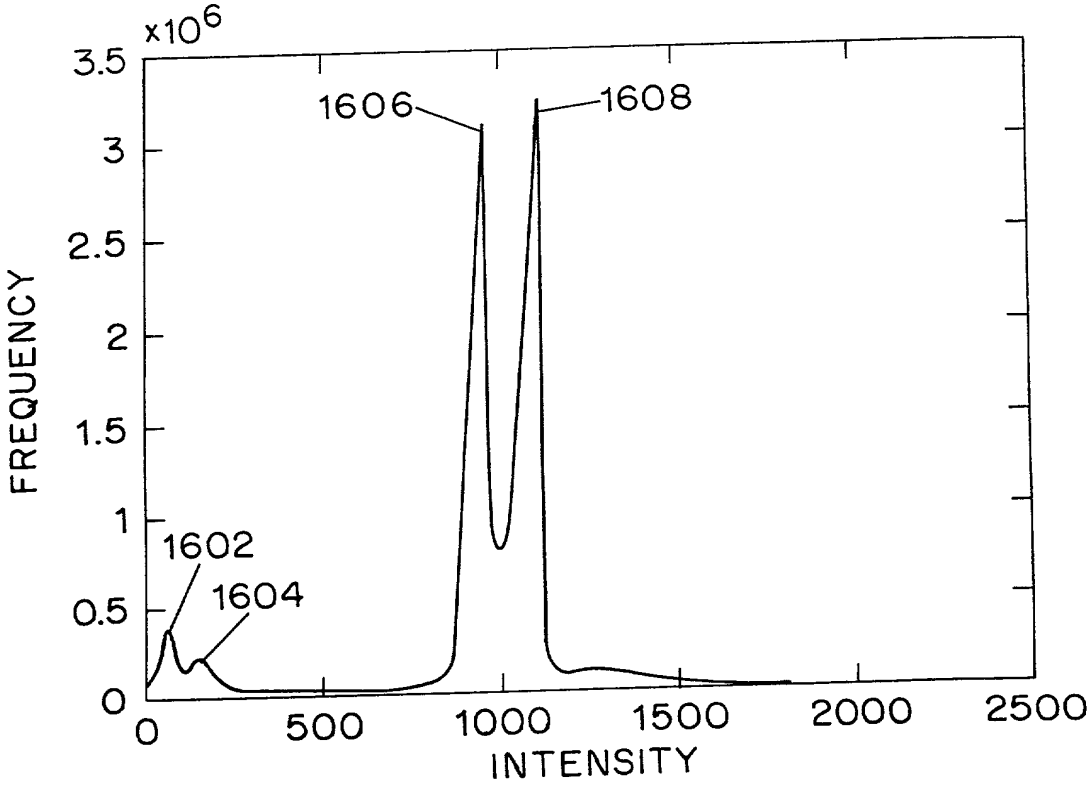

x10^6
3.5
3
2.5
2
1.5
1
0.5
0
FREQUENCY
1606
1608
1602
1604
0
500
1000
1500
2000
2500
INTENSITY

FIG. 16

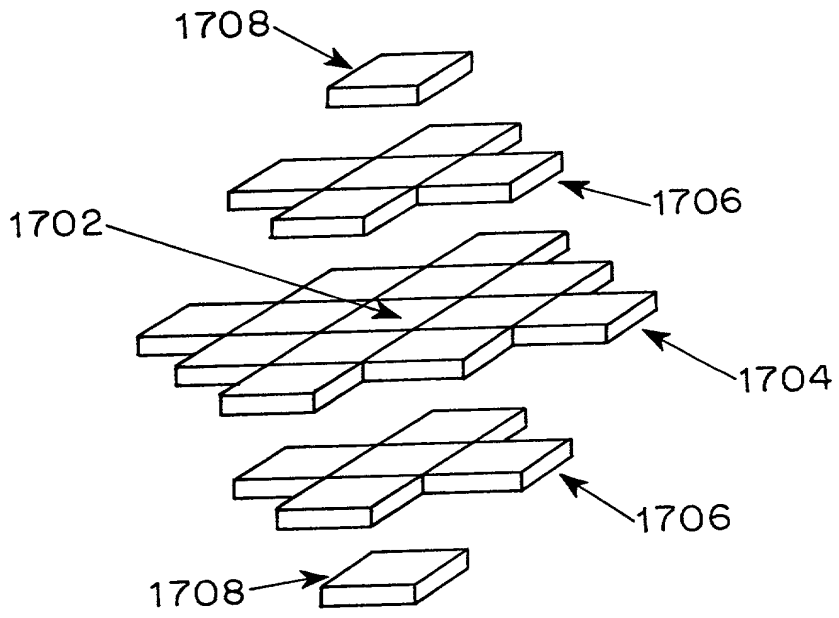

1708
1706
1702
1704
1706
1708

FIG. 17

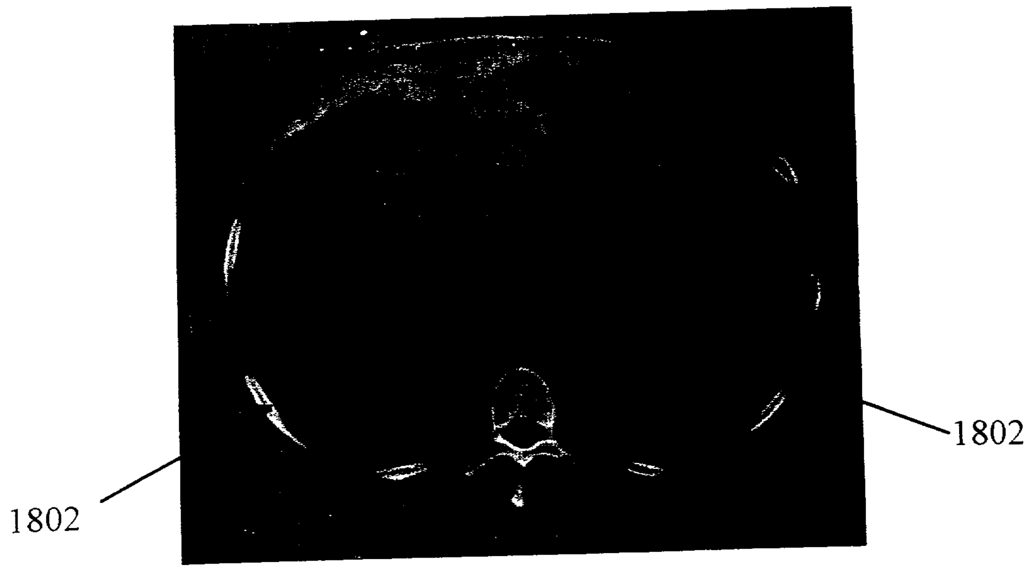


FIG. 18A

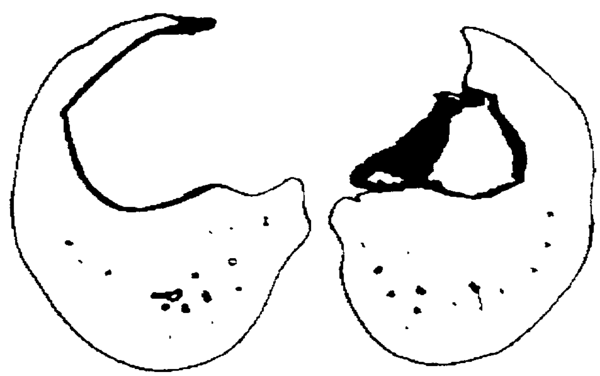


FIG. 18B

FIG. 18C

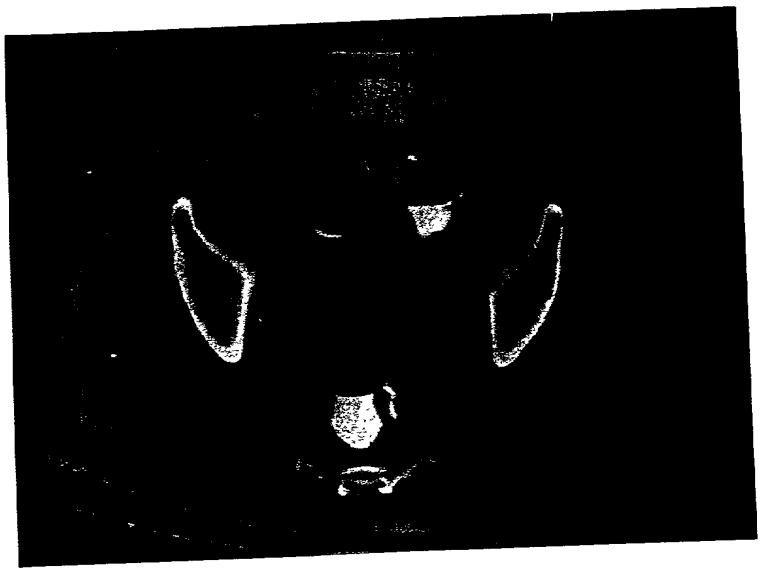


FIG. 19A

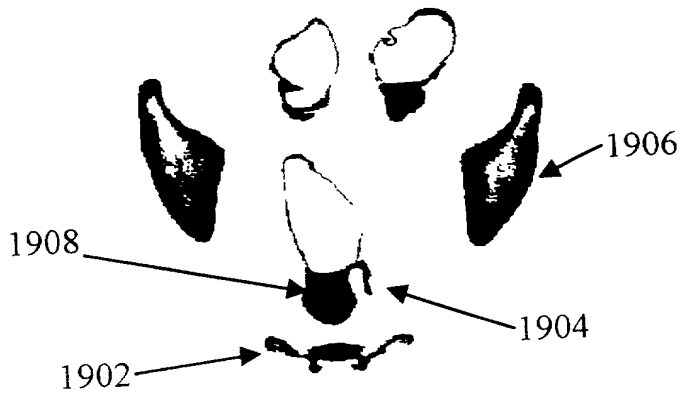


FIG. 19B

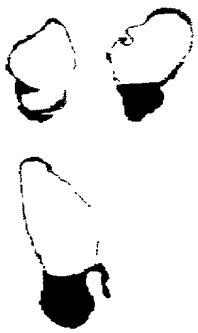


FIG. 19C

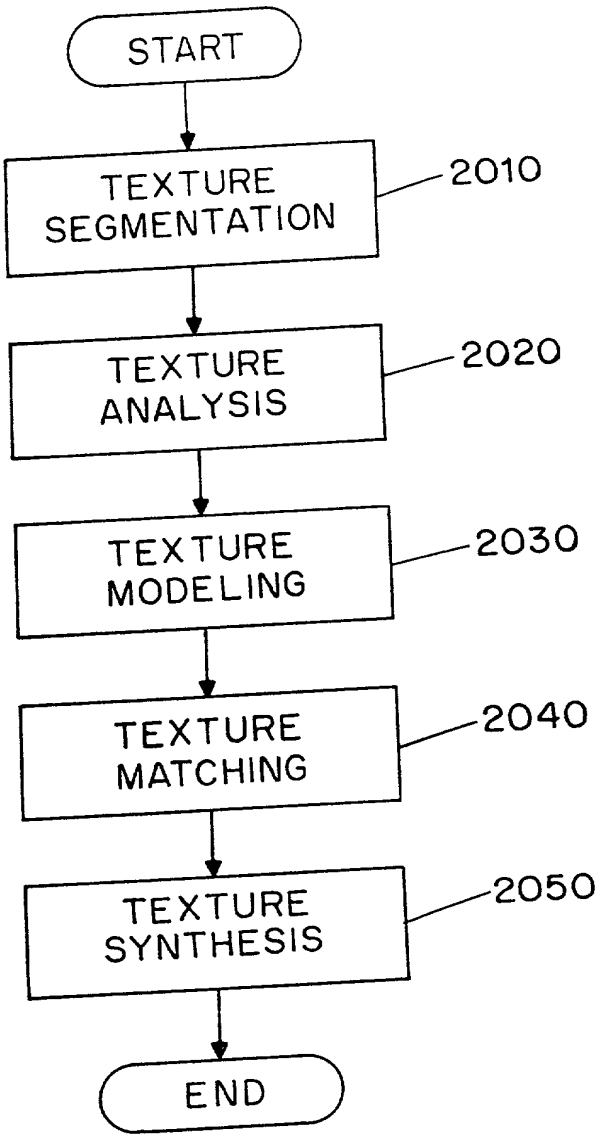

START
TEXTURE SEGMENTATION
2010
TEXTURE ANALYSIS
2020
TEXTURE MODELING
2030
TEXTURE MATCHING
2040
TEXTURE SYNTHESIS
2050
END

FIG. 20

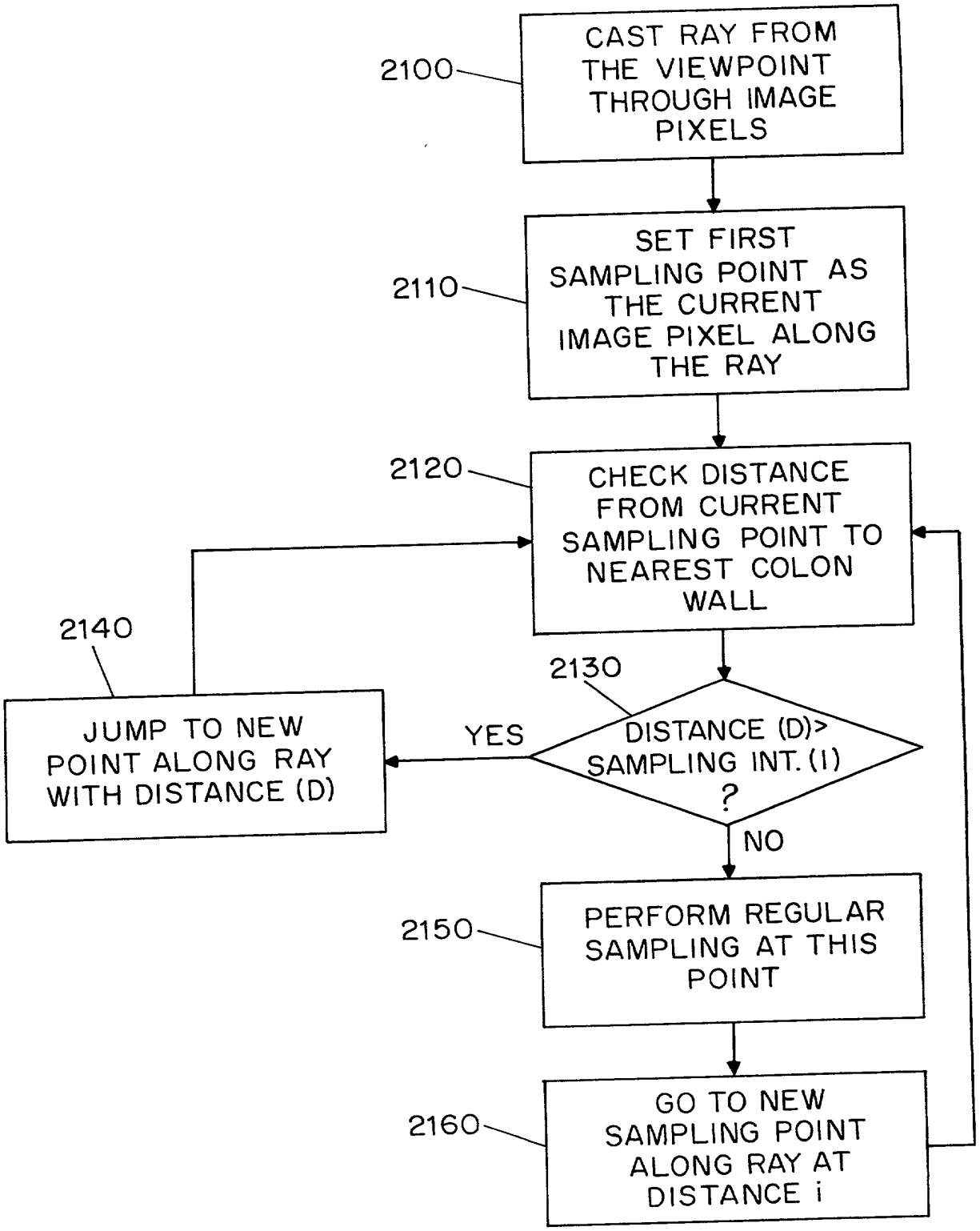

CAST RAY FROM THE VIEWPOINT THROUGH IMAGE PIXELS
2100
SET FIRST SAMPLING POINT AS THE CURRENT IMAGE PIXEL ALONG THE RAY
2110
CHECK DISTANCE FROM CURRENT SAMPLING POINT TO NEAREST COLON WALL
2120
DISTANCE (D)> SAMPLING INT. (I) ?
2130
YES
NO
JUMP TO NEW POINT ALONG RAY WITH DISTANCE (D)
2140
PERFORM REGULAR SAMPLING AT THIS POINT
2150
GO TO NEW SAMPLING POINT ALONG RAY AT DISTANCE i
2160

FIG. 21

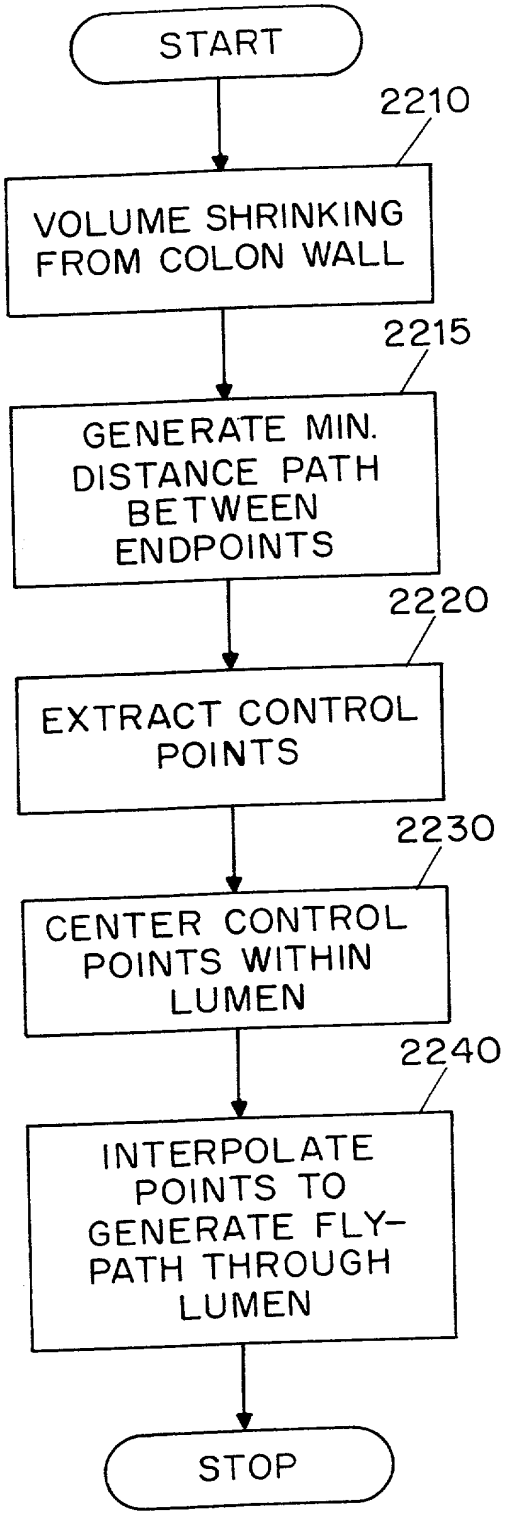

START
2210
VOLUME SHRINKING FROM COLON WALL
2215
GENERATE MIN. DISTANCE PATH BETWEEN ENDPOINTS
2220
EXTRACT CONTROL POINTS
2230
CENTER CONTROL POINTS WITHIN LUMEN
2240
INTERPOLATE POINTS TO GENERATE FLY-PATH THROUGH LUMEN
STOP

FIG. 22

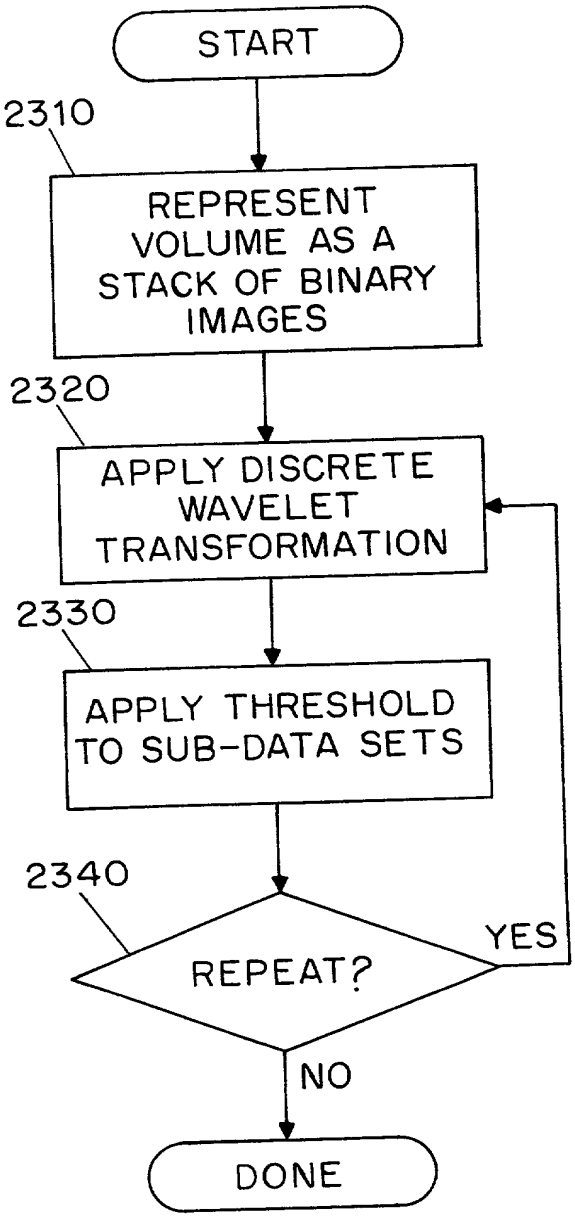

START
2310
REPRESENT VOLUME AS A STACK OF BINARY IMAGES
2320
APPLY DISCRETE WAVELET TRANSFORMATION
2330
APPLY THRESHOLD TO SUB-DATA SETS
2340
REPEAT?
YES
NO
DONE

FIG. 23

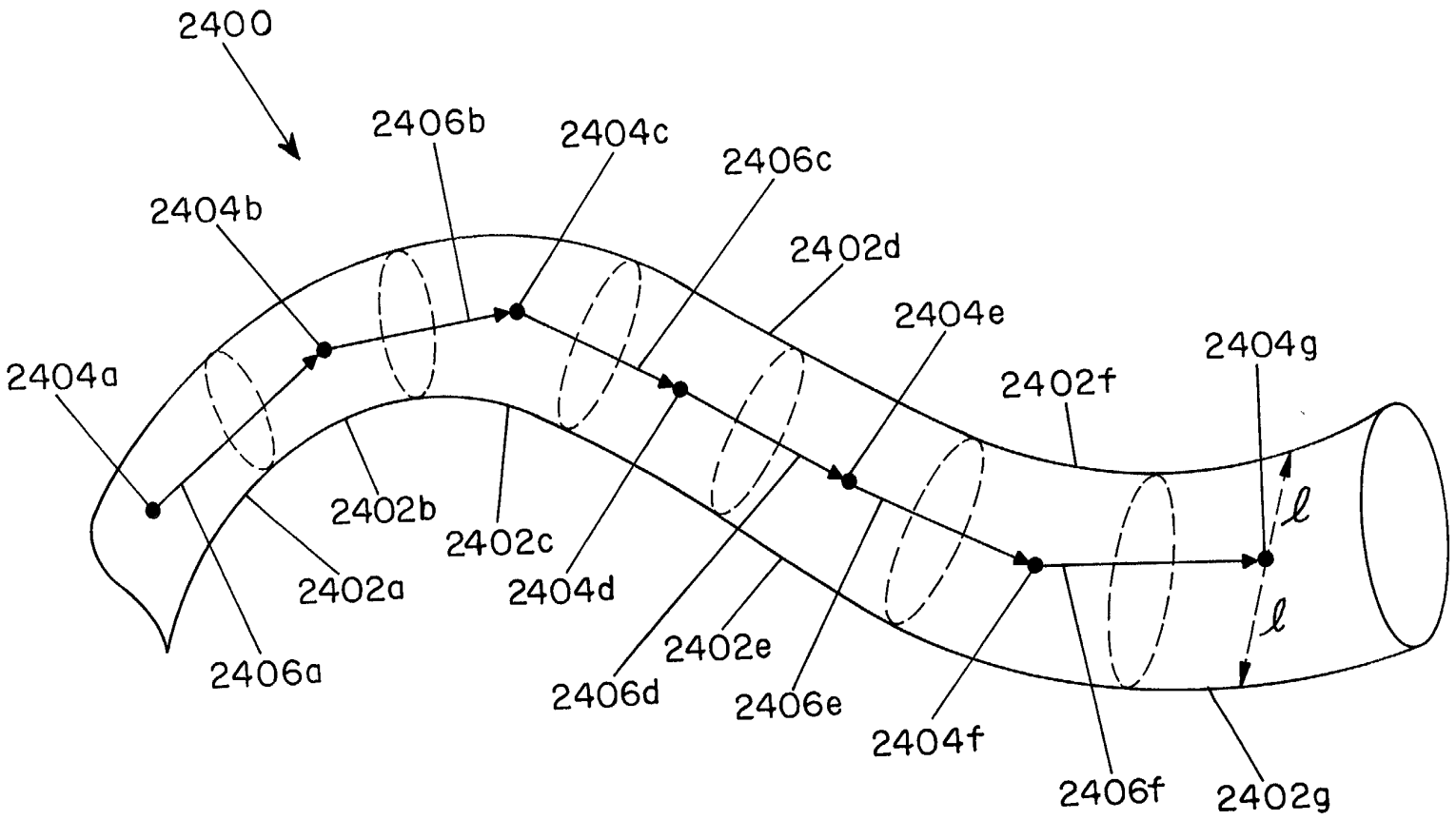


FIG. 24

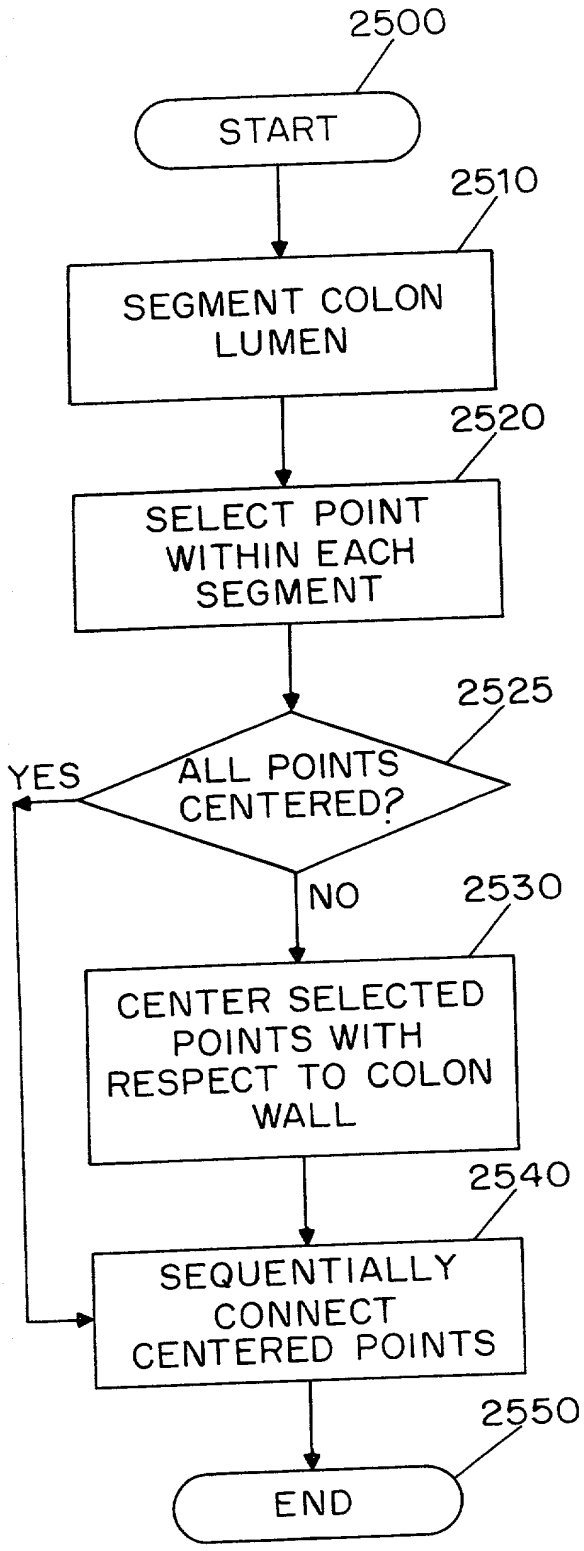


FIG. 25

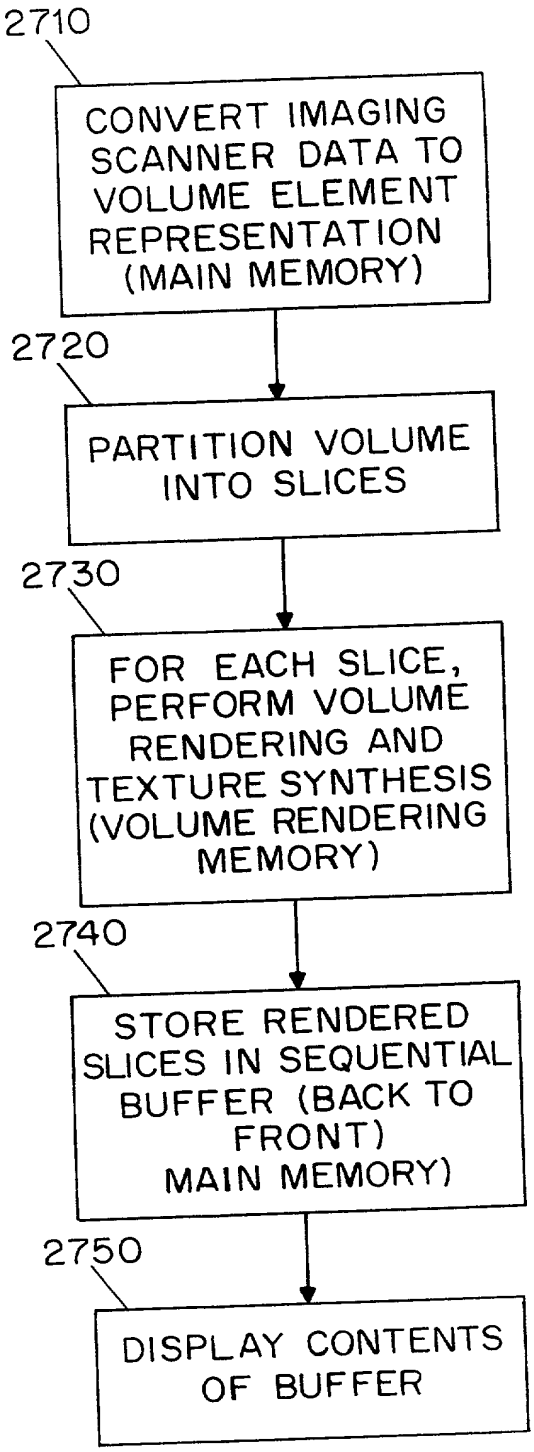


FIG. 27

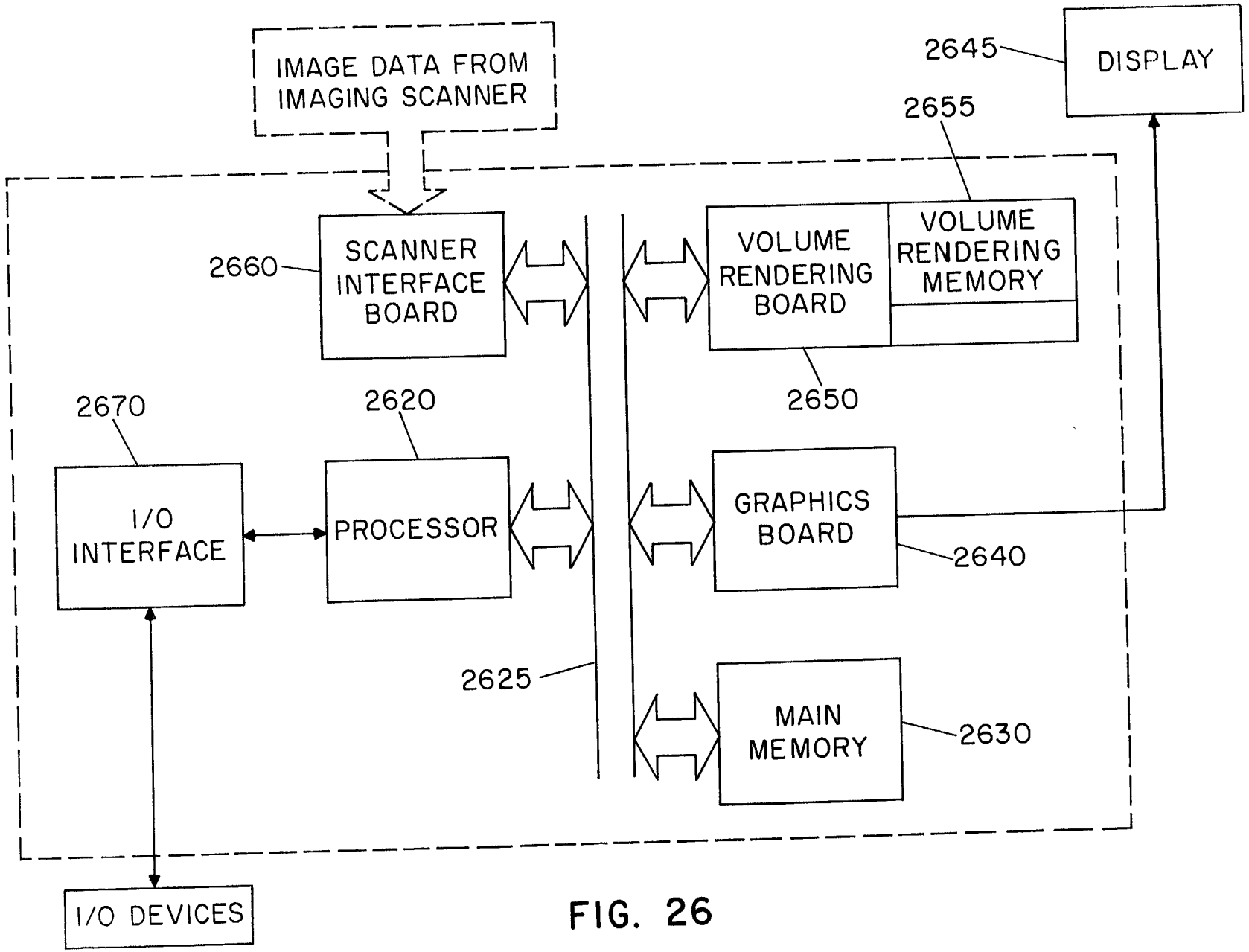


FIG. 26

AP 30612-C

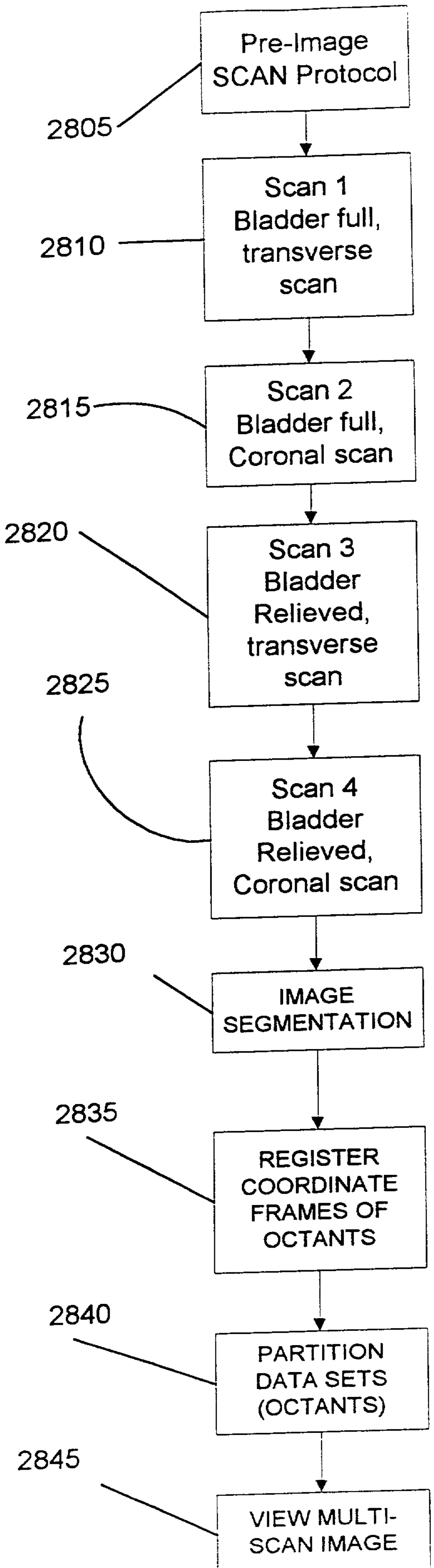
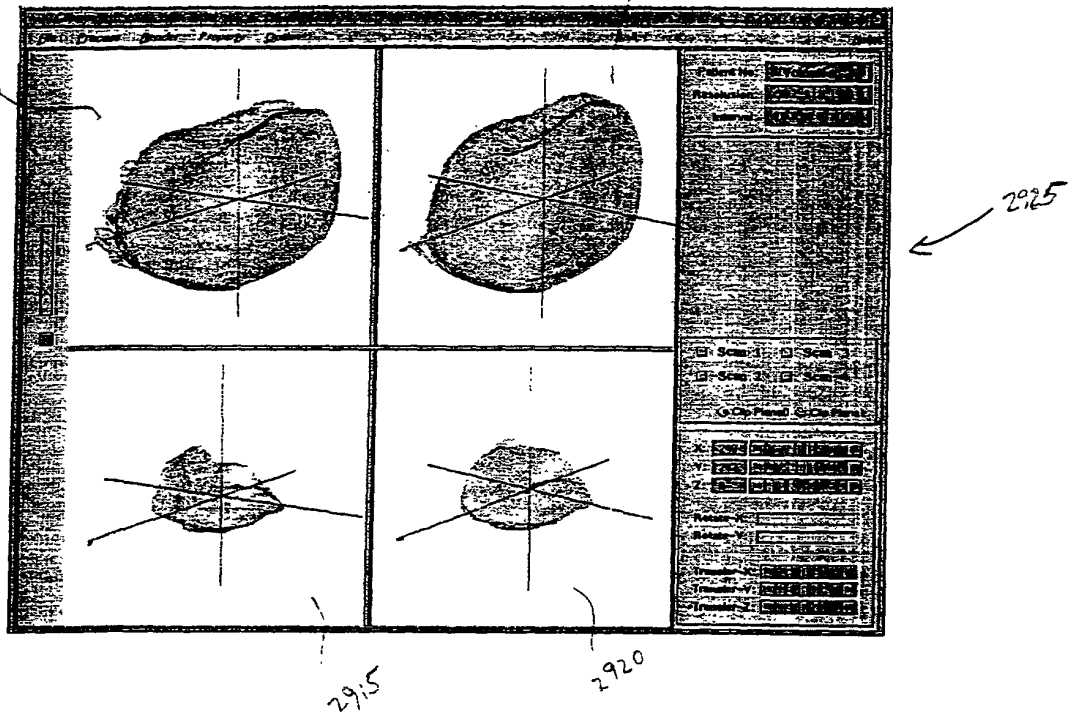


FIG. 28

FIG 29



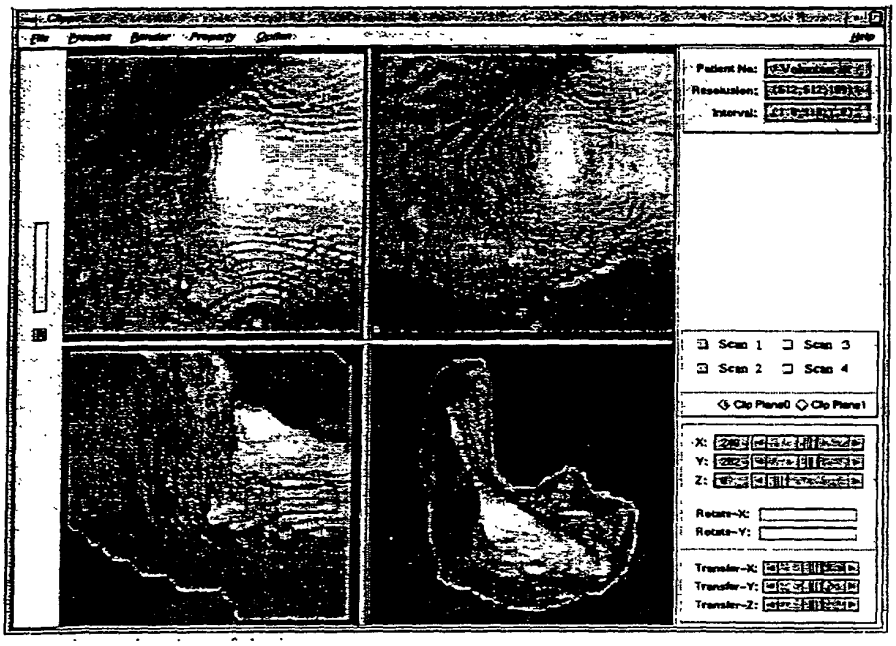


FIG 30

FIG. 31

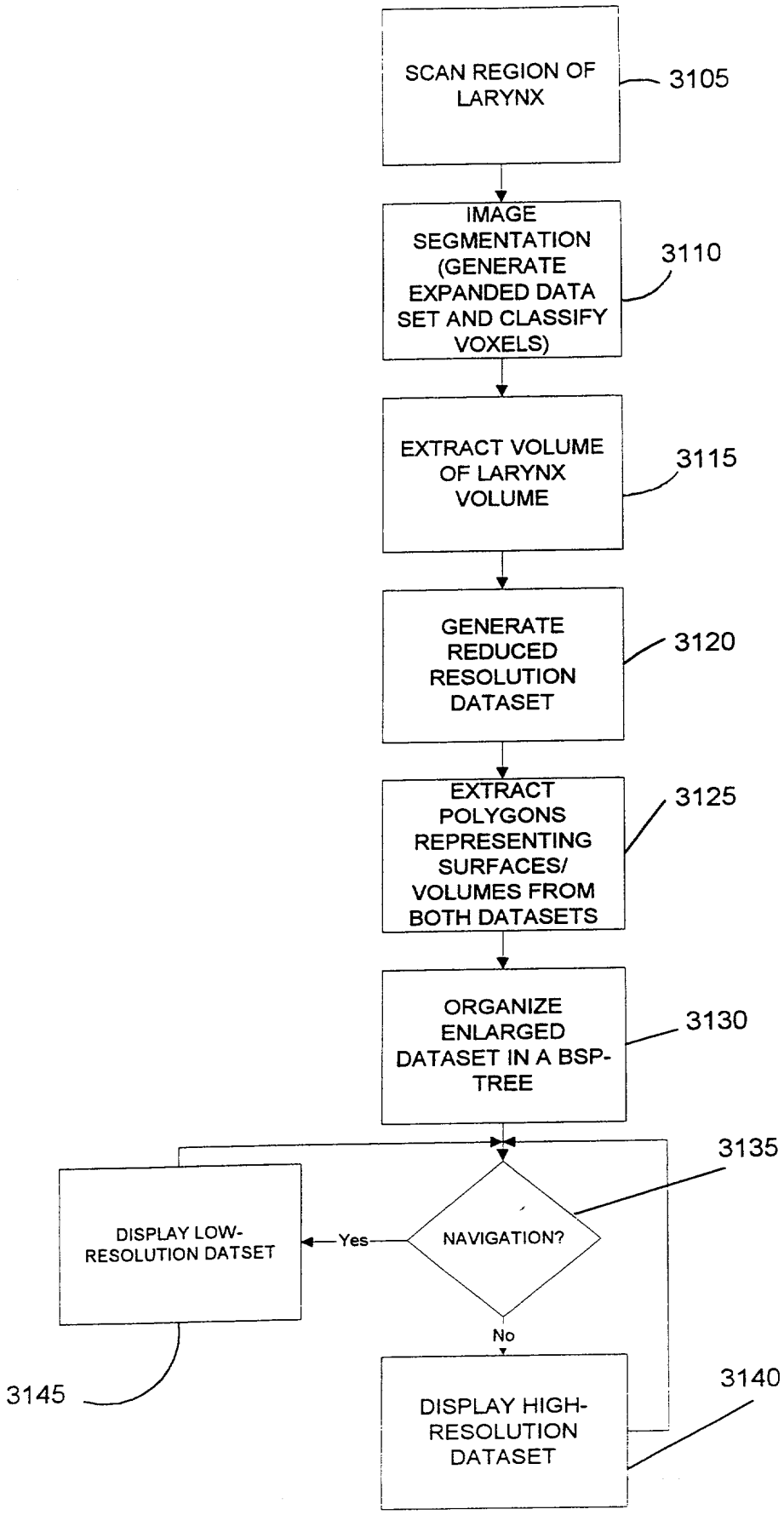

SCAN REGION OF LARYNX
3105
IMAGE SEGMENTATION (GENERATE EXPANDED DATA SET AND CLASSIFY VOXELS)
3110
EXTRACT VOLUME OF LARYNX VOLUME
3115
GENERATE REDUCED RESOLUTION DATASET
3120
EXTRACT POLYGONS REPRESENTING SURFACES/ VOLUMES FROM BOTH DATASETS
3125
ORGANIZE ENLARGED DATASET IN A BSP-TREE
3130
3135
NAVIGATION?
Yes
No
DISPLAY LOW-RESOLUTION DATSET
3145
DISPLAY HIGH-RESOLUTION DATASET
3140

FIG. 32

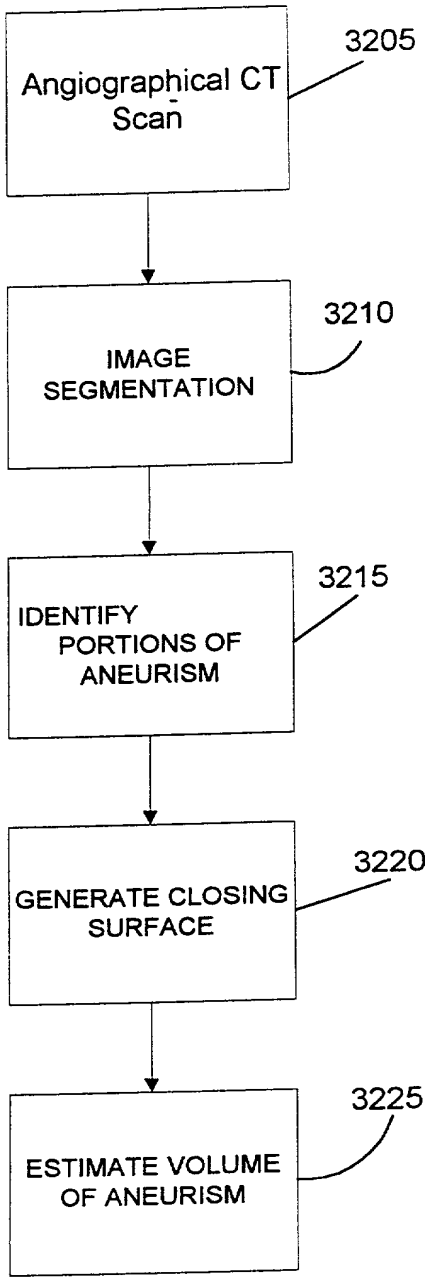

Angiographical CT Scan
3205
IMAGE SEGMENTATION
3210
IDENTIFY PORTIONS OF ANEURISM
3215
GENERATE CLOSING SURFACE
3220
ESTIMATE VOLUME OF ANEURISM
3225

FIG. 33A FIG. 33B FIG 33C

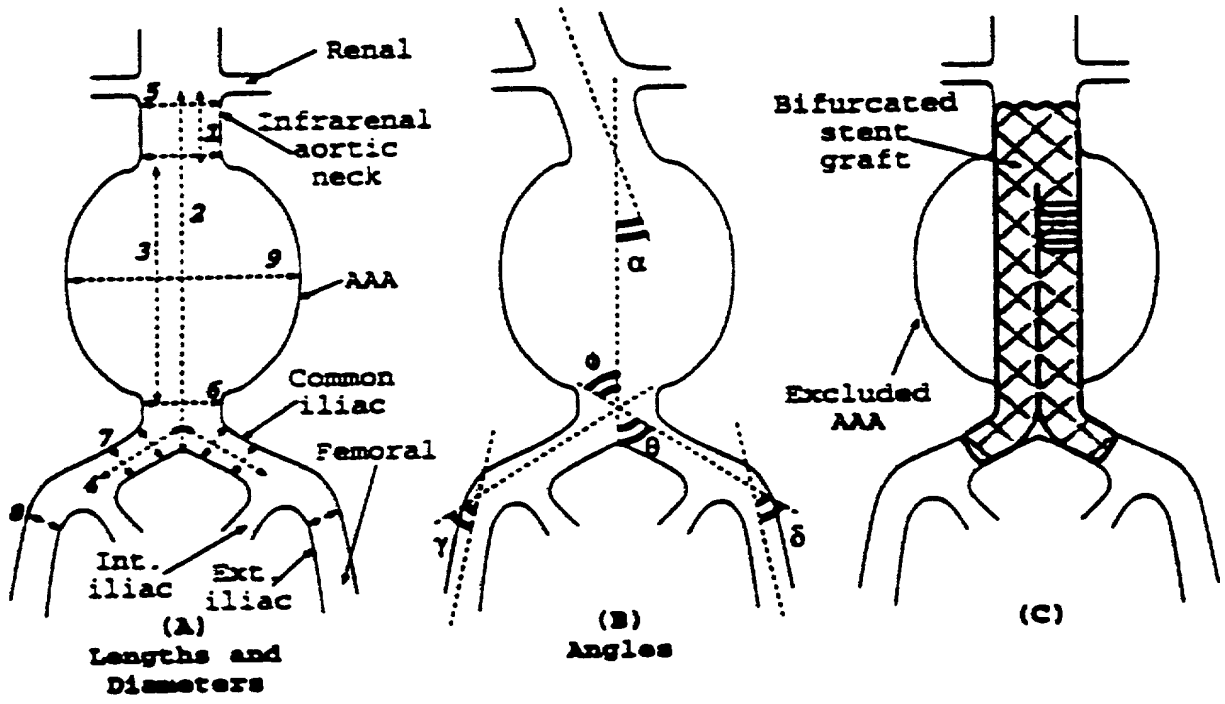


FIG. 34

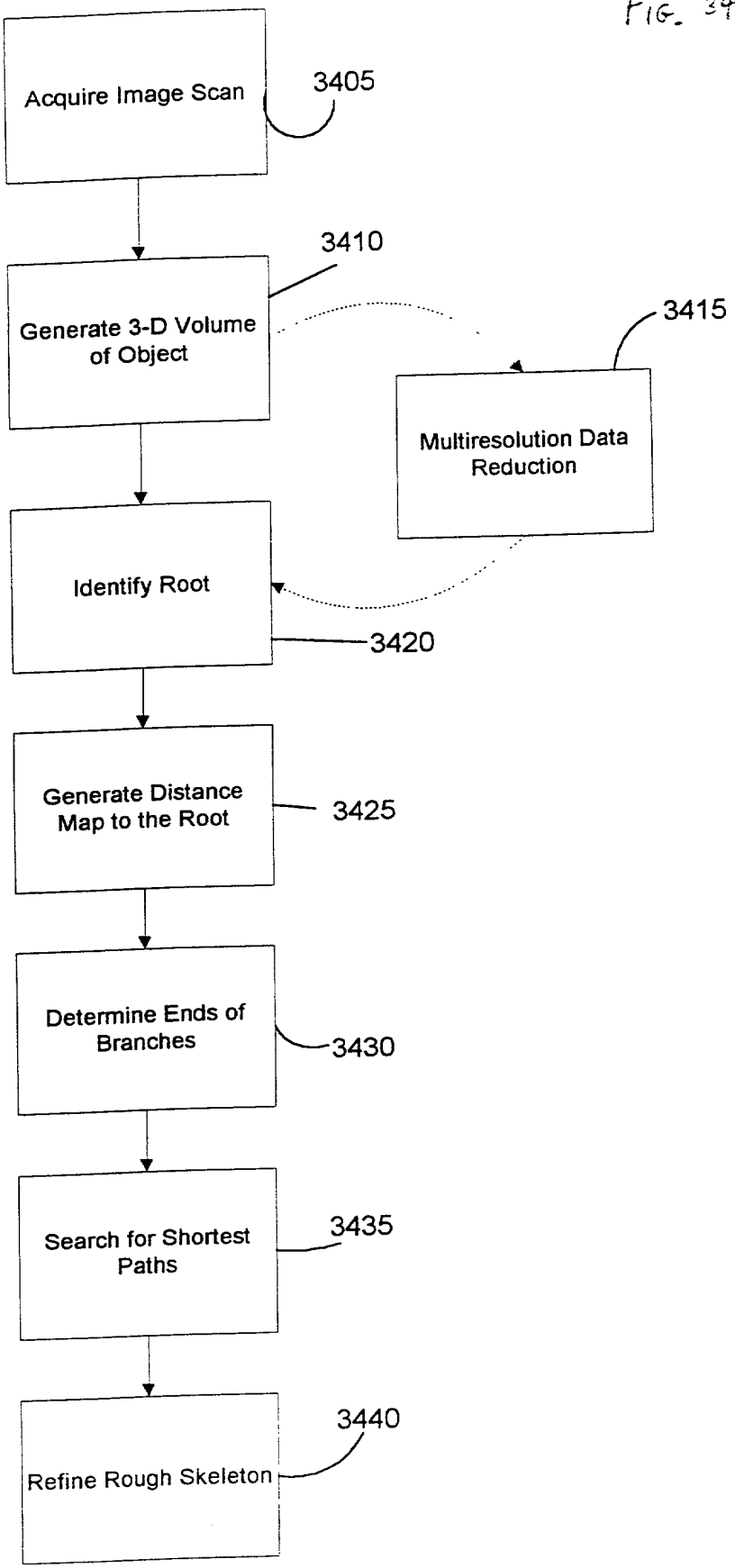
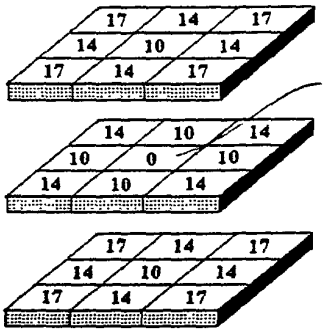


FIG. 35



35 25

FIG. 36

```
1)  Label root voxel with integer 0;
2)  Construct a queue and line up the root in the queue;
3)  If( There is at least one voxel in the queue )
        Serve the voxel x on the top of the queue:
        For( each of x's 26-connected neighbor voxel y) {
            If( y in the volume and has not been labeled yet ) {
                Line up the y in the queue;

                /* label the voxel y */
                Set dist = 999999 ;
                For( each of y's 26-connected neighbor voxel z ) {
                    If( z in the volume and has been already labeled with an integer of n_z ) {
                        d_z ≡ n_z + d(y,z);
                        where d(y,z) is 10, 14 or 17 if the Euclidean distance between y and z is
                        1, √2, or √3 , respectively;
                    }
                    If( dist > d_z ) {
                        label y with integer dist ;
                        dist = d_z ;
                    }
                }
            }
        }
        x leaves the queue;
    }
    Else {
        end of calculating the distance map.
    }
```